

Claims

1. A filtration apparatus for volume-reduced gel-state polystyrene resin, characterized in that the apparatus comprises

a filtration unit in the form of a hollow cylinder having an outer peripheral surface formed of a filter portion for filtering volume-reduced gel-state polystyrene resin;

a spiral plate provided on the inner surface of the filtration unit, projecting toward the inside of the filtration unit and spiraling in the axial direction of the filtration unit; and

a holding/driving portion for holding both axial ends of the filtration unit and for rotating the filtration unit about the axis thereof; wherein

the filtration unit is disposed so that the axial direction thereof is positioned generally horizontal, and the volume-reduced gel-state polystyrene resin is fed from the first end of the filtration unit to the inside thereof while the filtration unit is rotated by means of the holding/driving portion, whereby the volume-reduced gel-state polystyrene resin is continuously separated into volume-reduced gel-state polystyrene resin having passed through the filter portion and foreign matter contained in the volume-reduced gel-state polystyrene resin and transferred to the second end of the filtration unit by means of the spiral plate.

2. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 1, wherein the filter portion has slits provided in the circumferential direction of the filtration unit in the form of a hollow cylinder, each slit being defined by opposing walls.

3. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 2, wherein the opposing walls defining each slit have different heights, as viewed in the cross-section of the filtration unit in the axial direction of the unit, whereby an inner surface of the filter portion protruded/dented in the axial direction is provided.

4. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 2 or 3, wherein the slits are spirally provided.

5. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 4, wherein a protrusion is provided on a portion of the inner surface of the filtration unit in the axial direction of the unit.

6. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 2 to 5, wherein each slit has an inner space and an outer space, the inner space being provided in an inner portion of the filter portion and extending in the radial direction of the filter portion; the outer space being provided in an outer portion of the filter portion and extending in the radial direction of the filter portion; and the inner space and outer space are connected with a connecting portion having a width less

than the width of the inner space.

7. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 6, wherein the filter portion is formed of a first filter having a first through-hole, and a second filter having a second through-hole; the first through-hole being provided so as to penetrate the first filter in the thickness direction and serve as the inner space; the second through-hole being provided so as to penetrate the second filter in the thickness direction and serve as the outer space; the first filter and the second filter being provided such that they are disposed with a predetermined distance therebetween in radial direction and that the first through-hole and the second through-hole do not coincide with each other in the axial direction, to thereby form the slits.

8. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 7, wherein the second filter is formed of a plurality of comb-teeth-shape members disposed in the circumferential direction of the filtration unit; the frontal end of each comb-teeth-shape member with respect to the rotational direction of the filtration unit is secured to the outer peripheral surface of the first filter; the other end serves as a free end; and this other end and the first filter are disposed at predetermined spacing.

9. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 8, wherein the volume-reduced gel-state polystyrene resin which has been

filtered by means of the filter portion provided in the filtration unit is fed to a second filtration apparatus for filtering the volume-reduced gel-state polystyrene resin; the second filtration apparatus includes a microfilter in the form of a hollow cylinder finer than the filter portion provided in the filtration unit; and the volume-reduced gel-state polystyrene resin which has been fed under pressure to the inside the microfilter is extruded to the outside.

10. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 9, wherein the second filtration apparatus comprises the microfilter and a screw member that is fitted in the microfilter, and a tip of the screw member is brought into slidable contact with the inner surface of the microfilter, thereby scraping out foreign matter adhering on the inner surface of the microfilter.

11. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 10, which further comprises a scraper which is provided so as to abut, at the tip thereof, the outer peripheral surface of the filter portion for scraping out the volume-reduced gel-state polystyrene resin discharged to the outside through filtration by means of the filter portion.

12. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 11, which further comprises a feed pipe for feeding volume-reduced gel-state polystyrene resin, the feed pipe extending from the outside of the filtration unit to the inside of the

filtration unit.

13. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 12, wherein at least a portion of the feed pipe provided inside the filtration unit is formed of a trough having an opening on the upper side thereof.

14. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 13, wherein the filtration unit is held by the holding/driving portion in a slanted state such that the first end of the filtration unit is located on the upper side.

15. A filtration apparatus for volume-reduced gel-state polystyrene resin according to any of claims 1 to 14, which further comprises heating means for heating the filtration unit, which heating means covers the outer peripheral surface of the filtration unit and is not in contact with the filtration unit.

16. A filtration apparatus for volume-reduced gel-state polystyrene resin according to claim 15, wherein the filtration unit is heated by the heating means in which warm water is circulated.

17. A filtration apparatus for volume-reduced gel-state polystyrene resin for any of claims 1 to 16, wherein volume-reduced gel-state polystyrene resin is heated to a predetermined temperature and is caused to pass through an ultrasonic filter to which ultrasonic vibration is applied so as to fluidize the resin, and the fluidized resin is

introduced into the filtration unit.